Geophysical Research Abstracts
Vol. 14, EGU2012-13289, 2012
EGU General Assembly 2012

Hydrological extreme events with Mike Basin

M.G. Pereira (1,2), S. Carvalho (), L. Fernandes (1), L. Caramelo (1), A. Alencoão (3,4)

(1) Centre for Research and Technology of Agro-Environment and Biological Sciences (CITAB), University of Trás-os-Montes and Alto Douro, Vila Real, Portugal (gpereira@utad.pt , lcaramel@utad.pt, lfilipe@utad.pt), (2) Instituto Dom Luiz – Universidade de Lisboa, Lisboa, Portugal (gpereira@utad.pt), (3) Departamento de Geologia, UTAD, Vila Real, Portugal (alencoao@utad.pt), (4) ICGUC, Universidade de Coimbra, Coimbra, Portugal (alencoao@utad.pt)

This work is part of a broader project which aims to develop an integrated system to model and simulate of the hydrological cycle processes at river basin scale. All these processes involved in the dynamics of a watershed, which play an important role in the proper management and sustainable use of water resources, are influenced by many factors (e.g. soil use, vegetation cover, weather and climate) being of particular importance, all aspects related to the occurrence, amount and the spatial-temporal distribution of precipitation. We focus our work on the use of the MIKE Basin model and apply it to the Corgo River basin, which is a tributary of the Douro river, located in the Portuguese region of Trás-os-Montes and Alto Douro.

Different datasets were used to characterize and model the river basin catchment hydrological processes, namely temperature, precipitation and runoff registered in several weather/hydrometric stations from the Institute of Information System for Water Resources (http://snirh.pt/) as well as land use/soil occupation and topography maps. The MIKE BASIN model runs on a Geographic Information System (GIS) to perform hydrologic modeling at basin-scale. This software allows a set of multisectoral water demands (domestic and industrial water supply, irrigation, hydropower generation, among others) and provides simulation and visualization in both space and time.

We start by using the topography, soil type, soil use and vegetation cover of the region. Then the model is calibrated and tested, comparing model runoff estimates with observed data. Finally, the model is used to simulate the river basin catchment behavior to the typical conditions of the hydrological extreme events namely, heavy precipitation and drought. We present the geologic, hydrologic and climatologic characterization of the Corgo river catchment, list the most important factors that control the water availability in the river basin, describe the MIKE BASIN model calibration process, and discuss the role of each factor through sensibility tests and the estimated impacts of extreme events on the river basin management.